

**SOUTHWEST FISHERIES SCIENCE CENTER**  
**FOURTH QUARTER REPORT-FY 2003**  
For the Period July 1-September 30

**Submitted by:** Norman Bartoo, Acting Division Director, Fisheries Resources Division

**2. Title of accomplishment:** Integrate echo sounders into multi-instrumented autonomous buoys

**3. Current status:** Completed.

**4. Background information:** The Southwest Fisheries Science Center (SWFSC) is cooperating with the U.S. Tuna Fishing Industry to develop methods for remotely identifying the sizes and species of tuna and other fishes that are associated with FADs. It is expected that through improved remote detection capabilities, undesirable by-catch can be reduced and fishing efficiency can be increased.

**5. Purpose of activity:** Multi-instrumented buoys were developed to characterize the spatial, temporal, and size distributions of tuna and other fish beneath and surrounding FADs used by the U.S. purse seine fleet fishing in the central-western Pacific. The buoys and a suite of shipboard sensors were designed to study tuna distributions, environmental conditions, and predator-prey interactions. Data from these buoys and the shipboard sensors might be used to assist fishing and management efforts to develop and modify purse seine fishing strategies to minimize by-catch and ensure the long-term sustainability of FAD-based tuna fisheries in the tropical Pacific.

**6. Description of accomplishment and significant results:** We integrated multiple-frequency split-beam echo sounders, a 360-degree sonar, a passive-acoustical hydrophone, an underwater video camera with lighting, a data logging and control computer, a GPS, a 900 MHz spread-spectrum radio modem with antenna, a radar transponder and reflector, a strobe light, an AGM battery, solar panels, and a custom power control circuit. The buoy is a variant of another AST design that has been successfully deployed in the Southern Ocean to describe krill abundance and dispersion, environmental conditions, and predator activities in an area around Cape Shirreff, Livingston Island, Antarctica. Information from beneath Fish Aggregating Devices (FADs) will be collected using these autonomous and remotely-monitored multi-instrumented buoys. Meteorological, echosounder, underwater video, and salinity and temperature versus depth data will be collected from the fishing vessel in an area surrounding the FAD(s).

**7. Significance of accomplishment:** The autonomous, remotely-monitored, multi-instrumented buoys allow long-term monitoring of fish and zooplankton beneath FADs or other ecologically important locations. In some situations, multi-frequency echosounder data can be used to identify animal taxa and sizes. The underwater video camera will allow visual validation of scatters; the passive acoustic system will provide new information on fish sounds, and the sonar will allow acoustical observations of animal behavior and dispersion.

**8. Problems:** None.

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